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PTO 03-3724

Japan Kokai

Document No. 04-9666

VACUUM PACKAGED INSPECTING CONTAINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

Washington, D. C. June 2003

Translated by: Schreiber Translations, Inc.

Country	:	Japan
Document No.	:	04-9666
Document Type	:	Kokai
Language	:	Japanese
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Applicant	:	Wakamoto Pharmaceutical Co., Ltd.
IPC	:	G 01 N 33/543 1/00 33/48 33/543
Date of Filing	:	April 27, 1990
Publication Date	:	January 14, 1992
Foreign Language Title	:	Shinku Hososareta Kensa Yoki
English Title	:	VACUUM PACKAGED INSPECTING CONTAINER

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SPECIFICATION

I. Title of the Invention

Vacuum Packaged Inspecting Container

II. Claims

1. A vacuum packaged inspecting container, which prevents the leakage and drying of preserving liquid in a reaction container frequently used by clinical inspection.

2. A vacuum packaged inspecting container according to Claim 1, in which a separate film sheet or an adhesive seal (a microplate exclusively for adhesive tape) is lightly placed on the inspecting container and then the container is put into a packaging film.

III. Detailed Description of the Invention

(1) Field of Industrial Application

Recently, the development of an enzyme immunoassay applied to clinical inspection drugs, etc. is striking, and its demand has traced a way of increase.

[1] Numbers in the margin indicate pagination in the foreign text.

Under such a background, this invention is to provide an vacuum packaged inspecting container having good quality and an improved operating efficiency in packaging a commonly used inspecting container by the enzyme immunoassay.

2. Prior art

A material (an antibody or an antigen) reactable with an object to be analyzed is used by solidifying it on the surface of wells to assay the object to be analyzed in a 96 well microplate or its divided plate (called microplate, respectively) being constituents of a diagnosis kit of the enzyme immunoassay, etc.

However, solidified materials are generally produced by adding a preserving liquid with a stabilizer because they are unstable to temperature or physical impact, etc.

Therefore, the leakage of a preserving liquid generated in transportation, the decrease or loss of a preserving liquid in storage must be prevented to secure the quality of finished products.

To solve such a problem, a material is made into a product by pressing an adhesive tape such as a sealing tape, e. g., a tape made by Sanko Junyaku Co., Ltd., etc. on the topside of a microplate.

However, it is present situation that the pressing strength is also weak in this operation because it is pressed onto a rough surface different from a uniform surface and the preserving liquid /2 frequently leaks and inferior products occur in succession due to a temperature difference in transportation or storage, consequently the operating efficiency is also extremely bad and costs a great deal of labor in production and quality control.

(3) Problems to Be Solved by the Invention

In view of these problems, the inventors made earnest tests and studies on the packaging of microplates, consequently they could solve these problems at a stroke by vacuum packaging with ordinary packaging film used for food, etc.

(4) Means for Solving the Problems

Fig. 1 schematically shows the general view of a vacuum packaged microplate. **a** is a microplate part for packaging, a material reactable with an object to be analyzed is solidified on the inside surface of wells to measure the object to be analyzed, subsequently the wells are filled with a preserving liquid added with a stabilizer.

This microplate part **a** is sealed with a packaging film **b**. Polyethylene film, nylon film, aluminum coating film, etc. can

be used as this packaging film if they are a packaging material used for ordinary packaging.

These packaging films have excellent shut-off effect of oxygen, nitrogen, carbon dioxide, etc., strong breakage resistance and impact resistance, i. e., they are such a best material capable of maintaining the state at the time of vacuum packaging for long.

Moreover, the packaging films have a form of bag with an opening **d** on one side and all sealed by heat pressing on the other side.

The final packaging form is made by inserting a microplate from the opening **d** and then disposing it in a vacuum packaging machine to do a vacuum suction. After the inside of the packaging film attains a vacuum, the vacuum packaged state is maintained to complete a product by performing heat sealing.

Fig. 2 is a schematic diagram of a vacuum packaged divided-type microplate.

Advantages of the divided-type microplate consists in that it is simple and has high economy because a necessary number of wells can be supplied for measurement in accordance with a necessary number of specimens, and remaining wells are storable.

To best use these characteristics, each block can be taken as a vacuum packaged container.

Fig. 2(a) shows one piece of the divided-type microplate, after a surface treatment similarly made as the plate of Fig. 1, its wells are filled with a preserving liquid.

The divided-type microplate is commonly used by dividing it into 6 divisions, 8 divisions or 12 divisions together with its purpose.

A plate used in Fig. 2 is an example of 6 divisions.

Pieces of the divided microplate are sealed with a packaging film **b**, vacuum packaging is continuously performed for respective pieces, six pieces equivalent to one 96-well microplate takes a form of vacuum packaging of receiving it in same bag to finish a product.

Fig. 2(f) is a heat pressed part which should divide the same film into 6 blocks so as to become vacuum packaging for every one piece, even if only a necessary number of blocks are unsealed, the remaining pieces can be maintained as they are in the vacuum packaging by having this part, thus it is simple and has a high economy.

Moreover, perforation can be attached to the center of said heat sealing **f**.

Furthermore, more safely, another film sheet or an adhesive seal **h**, preferably an adhesive tape exclusively for the microplate, can be lightly placed on the microplate, put into the packaging

film and vacuum packaged as it is. It further enhances the effects of preventing the leakage and drying of preserving liquid put into the wells of microplate because the adhesive seal is also pressed simultaneously.

As the adhesive tapes exclusively for the microplate, e. g., sealing tape (Sanko Junyaku Co.), plate sealers (Kosta Co.), plate seal (Sumitomo Bakelite Co.), pressure-sensitive film (Beckton-Dickson Co.), etc. are given. The vacuum packaging using an adhesive seal can be applied to all of 96-well microplate and divided-type microplate, e. g., 6 division, 8 division, 12 divi-

/3

sion, etc.

On the other hand, vacuum packaging machines, e. g., Kashiwaki vacuum packaging machine made by Nippon Polycello Industrial Co., Ltd., etc. are usable if they are usable in common vacuum packaging.

(5) Effects of the Invention

According to this invention, as shown in Fig. 1 and Fig. 2, the material is hygienically packaged and the leakage was also not recognized at all in the transportation of a preserving liquid, and the workability was also markedly improved. Actual examples will be shown below.

Actual Example 1 Packaging of microplate (Fig. 1)

A microplate **a** filled with a preserving liquid in a 120 x 200 m/m packaging film (Cowpack® N-2 made by Cowpack Co., Ltd.) is inserted from an opening **d** at normal pressure.

It was immediately put into a vacuum packaging machine (Kashiwaki FN-4-AGS) and the machine was operated to perform vacuum suction. If the vacuum attains 160 mmHg or below, a vacuum packaging became possible. Heat sealing was performed at a width of 0.8 cm in a position 15 cm from a bag end **c** in the last step to finish the packaging.

A finished product shown in Fig. 1 was obtained.

Actual Example 2 Packaging of divided-type microplate (Fig. 2)

A 160 x 340 mm packaging film **b** was heat sealed at an interval of 5 cm and a width of 0.8 cm beforehand to divide it into 6 blocks.

A film given by attaching perforations to the center of this heat sealing **f** was used for packaging of the divided-type microplate.

One piece **a** of said divided-type microplate filled with a preserving liquid was inserted from an opening **d** into each block, all of the six pieces were wrapped in this packaging film **b** at normal pressure, then put into a vacuum packaging machine and the machine was operated to perform vacuum suction.

If the vacuum attains 160 mmHg or below, a vacuum packaging became possible, a heat sealing was performed at a width of 0.8 cm in a position 12 cm from a bag end **c** in the last step to finish the packaging, and a finished product shown in Fig. 2 of one-piece individual packaging of the divided-type microplate was obtained.

Actual Example 3 Liquid leakage test

100 microplate vacuum packaged products and divided-type microplate vacuum packaged products in total were put into a corrugated cardboard with a pat to make a transportation test.

As a result, all of 100 pieces kept the vacuum packaged state and no liquid leakage was recognized.

Actual Example 4 Acceleration test

The microplate vacuum packaged products and divided-type microplate vacuum packaged products were stored for 3 months under conditions of 40°C and 75%.

Changes in appearance under these conditions (i. e., vacuum state, liquid leakage in wells, etc.) were not recognized, and the state at the time of vacuum packaging was maintained.

Actual Example 5 Vacuum packaging using adhesive tape

An adhesive tape (a sealing tape made by Sanko Junyaku Co., Ltd.) was placed on a microplate filled with a preserving

liquid, and then it was inserted from an opening into a packaging film Cowpack, N-2) under normal pressure.

It was immediately put into a vacuum packaging machine and the machine was operated to perform vacuum suction simultaneously with pressing the adhesive tape.

In the last step, it was heat sealed at a width of 0.8 cm to finish the packaging.

When the acceleration test and the transportation test were similarly made as Actual Examples 3, 4, same results as above were obtained.

Actual Example 6 Breakage test of vacuum packaged products using adhesive tape

Small wells were generated with a syringe on a packing film of vacuum packaged products using an adhesive tape obtained in Actual Example 5 to assume a broken state.

When a transportation test was similarly made as Actual Example 3, the leakage in the packaging film was not recognized at all, and it was found that the said adhesive tape was surely pressed onto the microplate.

IV. Brief Description of the Drawings

Fig. 1 is plan view of vacuum packaged microplate (96 wells)

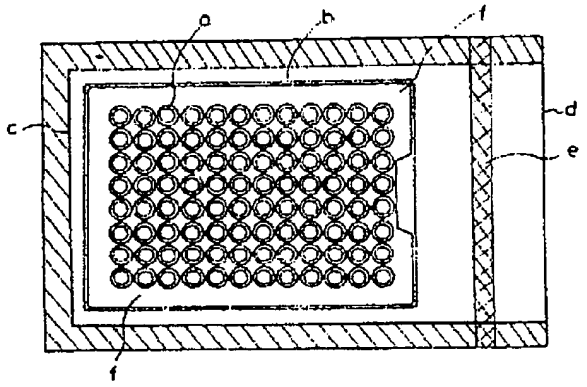
a: 96 well microplate, **b**: packaging film, **c**: bag end, **d**:

opening, **e**: heat sealing part, and **f**: film sheet or adhesive tape

Fig. 2 is plan view of vacuum packaged divided microplate (16 wells x 6)

a: divided-type microplate, **b**: packaging film, **c**: bag end, **d**: opening, **e**: heat sealing part, **f**: heat sealing part, **g**: perforation, and **h**: film sheet or adhesive tape

第 1 図



第 2 図